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The relationship between a history of acute infectious diseases and nutritional status based on weight-for-age among children under five

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Abstract

Background: Acute infectious diseases, particularly acute respiratory infections (ARI) and diarrhea, are common health problems among children under five and may adversely affect nutritional status. Infection may reduce appetite, impair nutrient absorption, and increase metabolic demands, thereby contributing to undernutrition.

Purpose: This study aimed to determine the association between a history of acute infectious diseases and nutritional status based on weight-for-age among children under five.

Method: This quantitative study employed an observational analytic design with a cross-sectional approach. Secondary data were obtained from medical records of children aged 12–59 months treated at Dr. H. Abdul Moeloek Regional Hospital in 2025. A total of 177 children were selected using purposive sampling according to predetermined inclusion and exclusion criteria. Nutritional status was assessed using weight-for-age z-scores based on the Indonesian Pediatric Association classification. The association between a history of acute infectious disease and nutritional status was analyzed using the Fisher-Freeman-Halton exact test with a significance level of $p < 0.05$.

Results: Among the 177 children, 120 (67.8%) had normal nutritional status, 45 (25.4%) were undernourished, and 12 (6.8%) were categorized as overnourished or at risk of overnutrition. ARI was recorded in 130 children (73.4%), while diarrhea was recorded in 47 children (26.6%). Undernutrition was more common among children with a history of diarrhea (46.8%) than among those with a history of ARI (17.7%). The Fisher-Freeman-Halton exact test demonstrated a statistically significant association between a history of acute infectious disease and nutritional status ($p = 0.002$).

Conclusion: A history of acute infectious disease was significantly associated with nutritional status based on weight-for-age among children under five. Children with a history of diarrhea had a higher proportion of undernutrition than those with a history of ARI.

Keywords: Acute Infectious Diseases; Children Under Five; Nutritional Status; Weight-For-Age.

INTRODUCTION

Infectious diseases remain one of the leading causes of high morbidity and mortality among children under five in many countries. Diarrhea and acute respiratory infection (ARI) are the types of infection most commonly found in this age group and can cause serious health consequences when they occur repeatedly. Children who experience infections generally show reduced appetite, disturbances in digestion and nutrient absorption, and increased

energy requirements, making them more susceptible to impaired nutritional status (World Health Organization, 2024).

According to data from the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF), child malnutrition remains a major global health challenge. WHO emphasizes that the relationship between malnutrition and infectious disease is bidirectional: infection can

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worsen a child's nutritional status, while poor nutritional status lowers immunity and increases susceptibility to infection (World Health Organization, 2025); UNICEF, 2024).

In Indonesia, infectious diseases and impaired nutritional status among children under five remain health issues that have not been fully resolved. Infectious disease continues to dominate the reasons for health-service visits among young children, while the prevalence of undernutrition is still found in a fairly large proportion (Ministry of Health of the Republic of Indonesia, 2024). Based on the results of the 2024 Indonesian Nutritional Status Survey (SSGI), the national prevalence of underweight (low weight-for-age) among children under five was still around $\pm 16.9\%$, meaning that nearly one in six children under five in Indonesia still experiences undernutrition (Ministry of Health of the Republic of Indonesia, 2024).

Lampung Province recorded a varying prevalence of underweight across districts/cities, ranging from 9.4% to 19.7%. Several areas, such as Pringsewu (19.7%), North Lampung (18.4%), Tanggamus (17.4%), and Bandar Lampung (14.8%), showed relatively high figures. This variation reflects differences in social, economic, and environmental conditions, as well as access to health services, which together influence children's nutritional status in each region (Ministry of Health of the Republic of Indonesia, 2024).

Children's nutritional status is influenced by various interacting factors, particularly the direct factors of nutrient intake and infectious disease. The interaction between the two forms a cycle known as the infection-malnutrition cycle, in which infection and undernutrition worsen each other (Black et al., 2008). A number of studies have demonstrated an association between a history of infectious disease and impaired nutritional status in children under five. Another study showed that children who frequently experienced diarrhea and respiratory infections had a higher risk of undernutrition (Azrimaidaliza, 2022).

RESEARCH METHOD

This study used a quantitative observational analytic design with a cross-sectional approach. The study was conducted at Dr. H. Abdul Moeloek Regional Hospital, Bandar Lampung, using secondary data obtained from medical records of children treated during 2025. Data collection was conducted in April–May 2026.

The study population consisted of children aged 12–59 months recorded in the medical records of Dr. H. Abdul Moeloek Regional Hospital in 2025, with a total population of 318 children. The sample consisted of 177 children selected using purposive sampling based on predetermined inclusion and exclusion criteria. The minimum sample size was calculated using the Slovin formula with a 5% margin of error.

The inclusion criteria were children aged 12–59 months who had medical records from 2025, complete age and body-weight data for assessment of weight-for-age nutritional status, and a documented diagnosis of either ARI or diarrhea. The exclusion criteria included illegible or incomplete medical records, simultaneous ARI and diarrhea, congenital abnormalities, genetic disorders, chronic diseases affecting growth, and severe comorbidities such as congenital heart disease, tuberculosis, or malignancy.

The independent variable was a history of acute infectious disease, categorized as diarrhea or ARI. The dependent variable was nutritional status based on weight-for-age. Nutritional status was classified according to weight-for-age z-score as overweight ($> +3$ SD), at risk of overweight ($+2$ to $+3$ SD), normal (-2 to $+2$ SD), underweight (-3 to < -2 SD), and severely underweight (< -3 SD).

Data were analyzed using univariate and bivariate analyses. Univariate analysis was used to describe respondent characteristics, types of acute infectious diseases, and nutritional status. Bivariate analysis was conducted to determine the association between a history of acute infectious disease and nutritional status. Because the contingency table contained expected frequencies below 5 in more than 20% of cells, the Fisher-Freeman-Halton exact test was used. Statistical significance was determined at $p < 0.05$. Data were processed using SPSS

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RESEARCH RESULTS

Table 1. Characteristics of Respondents (N=177)

Variable	Results	p-value
Age (Mean±SD) (Months) (Range)	(25.16 ± 13.20) (0-47)	
1-11	38/21.5	
12-23	36/20.3	
24-35	55/31.1	
36-47	48/27.1	
Gender (n/%)		
Male	105/59.3	
Female	72/40.7	
Nutritional Status (n/%)		0.011
Overweight	4/2.3	15.347
At risk of overweight	8/4.5	
Normal	120/67.8	
Underweight	34/19.2	
Severely underweight	11/6.2	
Diagnosis (n/%)		
Diarrhea	47/26.6	
ARI	130/73.4	

The table shows the demographic and clinical characteristics of the 177 children under five included in the study. The mean age of the children was 25.16 ± 13.20 months, with an age range of 0–47 months. The largest proportion of children was aged 24–35 months (31.1%), followed by 36–47 months (27.1%), 0–11 months (21.5%), and 12–23 months (20.3%). Most participants were male (59.3%), while females accounted for 40.7%. Regarding nutritional status, the majority of children had normal nutritional status (67.8%). Meanwhile, 19.2% were classified as underweight and 6.2% as severely underweight. A smaller proportion was categorized as at risk of overweight (4.5%) and overweight (2.3%). Based on diagnosis, acute respiratory infection (ARI) was the most common diagnosis, accounting for 73.4% of cases, while diarrhea accounted for 26.6%.

The Fisher's Exact Test result showed a value of 15.347 with $p = 0.002$ ($p < 0.05$), indicating a statistically significant association between a history of acute infectious disease and nutritional status (weight-for-age) among children at Dr. H. Abdul

Moeloe Regional Hospital in 2025. The distribution pattern showed that children with a history of diarrhea had a markedly higher proportion of undernutrition compared to children with a history of ARI.

DISCUSSION

The results showed that the children recorded were predominantly male, numbering 105 children (59.3%). This predominance is consistent with the epidemiological pattern reported in various national studies (Lubis & Novziransyah, 2025; Sari & Agustin, 2023). Biologically, boys tend to have higher physical activity, leading to more frequent exposure to infectious agents in their surrounding environment. Immunologically, girls are known to have a stronger immune response, which is partly explained by the role of the X chromosome in the expression of genes related to immune regulation (Azis et al., 2023). Nevertheless, a number of studies have shown a relatively balanced sex distribution in acute infectious disease, indicating that environmental factors and

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local population characteristics also influence the distribution of cases (Syafriani et al., 2023).

The largest age group was 24–35 months (31.1%). In the age range under two years, children are in the immunological gap period, when passive immune protection from the mother through breastfeeding begins to decline while active immunity from basic immunization has not yet fully developed (Sagita et al., 2025). In older age groups, children are already more actively interacting with their outside environment and accustomed to consuming solid food, which increases the risk of exposure to contaminants that cause diarrhea (Sari & Agustin, 2023). This finding is supported with another research who showed that children aged 0–59 months overall had a higher tendency to experience infectious disease compared with other age groups (Akbar & Kurniawan, 2025).

This study found that 120 children (67.8%) had normal nutritional status, while 45 children (25.4%) were undernourished. This figure is higher than the national average of 14.8% based on the 2024 SSGI (Ministry of Health of the Republic of Indonesia, 2025). which is likely related to the characteristics of patients presenting at a referral hospital, where the clinical conditions encountered tend to be more severe and complex. Undernutrition is closely related to nutrient intake deficiency that weakens the immune system, while infectious disease experienced by children can worsen nutritional status through reduced appetite, impaired nutrient absorption, and increased metabolic demand to fight infection (Tanjung & Nazara, 2023). Another study found that of 279 respondents, 68 children (24.4%) were undernourished, with a history of infectious disease as one of the significant factors associated with this condition, consistent with the findings of this study (Syafriani et al., 2023).

Characteristics of Children by Diagnosis of Acute Infectious Disease

The results showed that most children were diagnosed with ARI (73.4%) and diarrhea (26.6%). Diarrhea in children occurs due to the entry of pathogenic agents into the digestive tract. Rotavirus is one of the leading global causes of diarrhea in children under five and can cause severe dehydration, malnutrition, and even death if not treated appropriately (World Health Organization,

2024). Pathophysiologically, diarrhea causes a massive loss of fluid, electrolytes, and nutrients within a short period, making it one of the direct causes of significant weight loss in children, particularly when episodes of diarrhea occur repeatedly (Situmeang, 2024).

Meanwhile, ARI develops through the interaction of infectious agents, host, and environment, spreading mainly through droplet transmission and direct contact. Although ARI primarily affects the respiratory system, prolonged or recurrent infection can still reduce oral intake and trigger an inflammatory response that systemically disrupts nutrient metabolism (Lubis & Novziransyah, 2025). Another studies confirm that infectious disease is an important determinant of undernutrition in children, highlighting the need for infection-prevention efforts integrated with nutritional improvement (Malau et al., 2025; Tingginehe & Tumbiri, 2023).

Association Between History of Acute Infectious Disease and Nutritional Status (Weight-for-Age)

The result of the Fisher's Exact Test showed a value of 15.347 with $p = 0.002$ ($p < 0.05$), indicating a significant association between a history of acute infectious disease and nutritional status (weight-for-age) among children at Dr. H. Abdul Moeloek Regional Hospital in 2025. The cross-tabulation showed that 46.8% of children diagnosed with diarrhea were undernourished, while only 17.7% of children with ARI experienced the same condition, consistently demonstrating that a history of diarrhea is associated with a markedly higher proportion of undernutrition compared with a history of ARI.

This association can be explained through several pathophysiological mechanisms. First, infection causes reduced appetite, so caloric and protein intake decreases during illness. Second, diarrhea directly impairs nutrient absorption in the intestine, so even if the child continues eating, nutrients cannot be optimally absorbed this mechanism also helps explain why the proportion of undernutrition in the diarrhea group is much higher than in the ARI group, whose effects are more systemic in nature. Third, the inflammatory response triggered by infection significantly increases the body's basal metabolic requirements. Fourth, recurrent episodes of infection worsen this condition because the body does not

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have time to restore its nutrient reserves before facing the next attack (Tanjung & Nazara, 2023).

This finding is consistent with the study at the Sukaratu Community Health Center, Tasikmalaya Regency, which involved children aged 6–59 months and found that infectious disease status was significantly associated with undernutrition (Indah et al. (2024). Another study in the working area of Ambarawa Community Health Center, Pringsewu Regency, also found a significant association between infectious disease and undernutrition in children aged 24–59 months. Furthermore, another study found that children under two with a history of infectious disease were far more likely to experience undernutrition than those without (Nasrianti et al., 2024; Samino et al., 2022). likewise reported a significant association between a history of infection and the risk of undernutrition in children. Taken together, these findings reinforce the consistency of the association between a history of infectious disease and nutritional status in children (Azrimaidaliza, 2022)

Overall, the results of this study confirm that the type of acute infectious disease, particularly diarrhea, is a factor significantly associated with undernutrition in children. This malnutrition-infection cycle can only be broken through a comprehensive approach, including thorough management of infection, regular monitoring of nutritional status, and adequate nutrient intake during and after illness (Syafriani et al., 2023; Samino et al., 2022).

CONCLUSION

A history of acute infectious disease was significantly associated with nutritional status based on weight-for-age among children under five at Dr. H. Abdul Moeloek Regional Hospital. ARI was the most frequently recorded acute infectious disease (73.4%), while diarrhea accounted for 26.6% of cases. Overall, 67.8% of children had normal nutritional status and 25.4% were undernourished. Undernutrition was more prevalent among children with a history of diarrhea than among those with a history of ARI. These findings highlight the importance of integrating nutritional assessment with the management of acute infectious diseases in children under five.

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